results than can be often obtained by assuming that a so-called non-inductive circuit is really non-inductive, and, therefore, that the apparent power is the true power.

IV. "On Galvano-Hysteresis. (Preliminary Notice.)" By Silvanus P. Thompson, D.Sc., B.A., Professor of Physics in the City and Guilds Technical College, Finsbury. Communicated by Professor G. Carey Foster, B.A., B.Sc., F.R.S. Received March 16, 1891.

1. If a sufficiently strong electric current is passed through a coil of insulated soft iron wire for a short time, and the wire then disconnected, and if, after the lapse of any length of time, the wire is placed in the circuit of a galvanometer, and is then subjected to longitudinal magnetisation or to a succession of alternately directed longitudinal magnetisations, it is found to discharge an electric current through the galvanometer.

2. The direction of the current discharged from the iron wire is found to be the same as that of the current which was originally passed through it.

3. The direction of the discharge current is opposite to that in which the discharge current would flow if the wire acted as a condenser.

4. A wire which has once produced such a discharge current will not produce a second unless again traversed by a charging current.

5. A wire which has not been subjected to any preliminary process of charging, that is to say, one which since being annealed has not been traversed by an electric current, does not sensibly show any such phenomena, either when subjected to longitudinal magnetisation or to a succession of alternate magnetisations.

6. The sense of the discharge current is quite independent of the direction of the longitudinal magnetisation used in producing the disturbance which effects the discharge.

7. The time-integral of the discharge current is independent of the duration of the charging current, provided this is not too suddenly turned off. It increases with the strength of the charging current up to a certain limit, being proportional to it through a certain range of values, but is not proportional to it for currents below or above certain limits of strength. These limits vary with the gauge of the wire, but are independent of its length. For a charging current of given strength the discharge current from a given wire is greatest if the charging current is gradually reduced to zero and not abruptly broken by a spark.

8. The time-integral of the discharge current is practically inde-

pendent of the intensity of the longitudinally-applied magnetising force if the latter exceeds a certain minimum value.

9. The author has investigated these phenomena by means of ring cores constructed of iron wire (annealed) covered with insulating material overwound with insulated copper-wire coils, the latter being wound in every case in a helix returning axially upon itself, so that the current in this copper wire should have null effect in directly generating any induced electromotive forces along the iron-wire core.

10. The effects obtained are considered by the author to be akin to those obtained by Villari,* in 1865, by the mechanical agitation of iron bars through which electric currents had been previously passed, and, like the effects of Villari, to be due to the production and subsequent disappearance of a circular magnetisation. They are also akin to those observed by Hughes† with the induction balance.

11. The author has been able to imitate and reproduce these effects by the use of copper wires immersed in iron filings, and surrounded by a magnetising coil wound so as to return axially upon itself.

Presents, April 9, 1891.

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* 'Poggendorff, Annalen,' vol. 126, 1865, p. 87.

† 'Roy. Soc. Proc.,' vol. 31, 1881, p. 531.